



National Aeronautics and
Space Administration

John C. Stennis Space Center
Stennis Space Center, MS 39529-6000

SSTD-8070-0004-CONFIG Rev. A-1
FEBRUARY 2016

John C. Stennis Space Center

PREPARATION OF CONSTRUCTION

SPECIFICATIONS

Original signed by

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Design & Construction Project
Management Division

12-3-14
Date

Issued by

Issued CEF
Central Engineering Files

12-5-14
Date

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Document History Log

Revision	Date	Originator(s) /Phone	Description
Basic	04/07/09	Chris Williamson, x8-1906	Initial release. Supersedes SSC-STD-99-006.
A	12/04/14	Ben Stephens x8-2792	Five-year review. Format and grammatical changes made. Updated references and acronyms. Revised 4.2.10: Refined Field Tests and Submittals process; and added, "The specifier shall review the submittal register for duplications, omissions, and errors prior to final release." "FOSC" changed to "NASA or its designee" in all references throughout document.
A-1	02.12.16	R. Carol Wolfram x8-1164	Administrative change. Replaced "FOSC" and "NASA or its Designee" with "SACOM" throughout document.

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1.0 INTRODUCTION

1.1 Purpose

Developed by the National Aeronautics and Space Administration (NASA), SpecsIntact was designed for use by engineers, architects, specification writers, project managers, and construction managers to combine all or parts of existing specifications to create a unique specification for a given project. The SpecsIntact system and format allows for interchanging master text sections between agencies to promote uniformity, minimize duplication, and reduce the maintenance cost of common master text sections. NPR 8820.2 states, "For all CoF [Construction of Facilities] project specifications, designers shall use SpecsIntact, i.e., the Uniform Facilities Guide Specifications (UFGS) found in the Whole Building Design Guide (WBDG) (see <http://specsintact.ksc.nasa.gov/> and <http://www.wbdg.org/>). For equipment or systems not adequately specified by using the UFGS, the designer may use professional judgment." This John C. Stennis Space Center (SSC) standard (SSTD) presents a general guideline for selecting the content to describe the quality and type of workmanship and materials required for construction procurement at SSC. The format and specification standards described herein are developed for the NASA SpecsIntact automated system.

1.2 Applicability

This standard provides an established format for the orderly arrangement of material in the preparation of new or revised construction specifications at the John C. Stennis Space Center (SSC). This standard is applicable to all NASA SSC organizations preparing construction specifications for CoF projects.

1.3 Requirements

For design by contract, one of the following will be provided.

1. A requirement in the Architect and Engineering firm's work statement to utilize SpecsIntact for development of project specifications;
2. An electronic copy of the necessary software and Master Text to Architect and Engineering firm as appropriate; or,
3. Master Text or Local Master Text for "redlining" and "inputting" by the SpecsIntact Clerk. If an electronic copy of the software and master text is provided, the User's Guides and support numbers are contained in the SpecsIntact program.

For hardware and software requirements and detailed instructions on using the SpecsIntact software, see the SpecsIntact Quick Start Guide.

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2.0 REFERENCES AND APPLICABLE DOCUMENTS

Documents listed within this section are to be used as reference material in the preparation of Construction Specifications. Applicable documents shall be the latest version unless otherwise specified.

ASME Y14.38, *Abbreviations and Acronyms for Use on Drawings and Related Documents*
Construction Specifications Institute (CSI) Manual of Practice, *Reference*
MIL-STD-12, *Abbreviations for use on Drawings and in Specifications, Standards and Technical Documents*
MIL-STD-3007F, *Standard Practice for Unified Facilities Criteria and Unified Facilities Guide Specifications*
NASA SpecsIntact – SpecsIntact Learning Guide Series, *Reference*
NPR 8820.2, *Facility Project Requirements*
SPR 1440.1, *Records Management Program Requirements*
SSTD-8070-0005-CONFIG, *Preparation, Review, Approval, and Release of SSC Standards*
U.S. Government Printing Office Style Manual (GPO), *Reference*

3.0 RESPONSIBILITIES

Responsibilities for the maintenance, control, use, and application of this SSTD are as follows:

- NASA SSC and contractor organizations are responsible for review and approval of changes to or cancellation of this SSTD in accordance with SSTD-8070-0005-CONFIG.
- Synergy-Achieving Consolidated Operations and Maintenance (SACOM) Engineering Services Department (ESD) shall support the NASA SSC Center Operations Design & Construction Project Management Division with development, review, approval, and release of changes to or cancellation of this SSTD in accordance with SSTD-8070-0005-CONFIG.
- Users of this SSTD shall comply with its requirements, ensure use of the correct version of this SSTD and the documents it references, and inform the appropriate organization of needed changes in accordance with SSTD-8070-0005-CONFIG.
- SACOM Computer-aided Design and Drafting (CADD) supervision and Central Engineering Files (CEF) are responsible for the application of this standard in work practices, as applicable.

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4.0 TECHNICAL SECTIONS

4.1 SpecsIntact System

SpecsIntact is an abbreviation for "specifications kept intact", an automated system for using a standard master text of construction specifications to develop a construction specification for a particular project. The master text contains detailed specifications for most activities. In some instances, there is a need for more than one specification provision for a single activity. SpecsIntact allows the extraction of all or parts of multiple specifications to be combined to create a unique specification for these projects. It is the responsibility of the specification writer (specifier) to select and edit those provisions appropriate to the project and to provide additional new text as required. Drawings define the magnitude and configuration of a project, and the technical specifications determine the quality of materials and workmanship.

The master text is divided into 48 divisions, which are further subdivided into sections. Each section is divided into three parts: Part 1 – General, Part 2 – Products, and Part 3 – Execution. Division 01 contains General Requirements, while divisions 02 through 48 are technical divisions. Division titles are listed in Appendix C.

Each section is identified by a six-digit number (e.g., 23 00 00). The first two digits indicate the division of which the section is a part (Division 23 for our example).

Other than format, all portions of a section are subject to changes, as required. If not completely suitable for a project as stated, words, sentences, paragraphs or an entire part may be augmented, modified, or marked "Not Applicable". Unique requirements should be added.

In certain instances, the master text may not cover specialized needs due to such items as local codes that may be imposed, geological and climatic conditions, or specialized project needs that may exist. To accommodate these specialized needs, sections must be modified to reflect those local requirements, or a new section must be generated.

4.2 Specification Content

4.2.1 Cover Page

The cover page shall contain the name of the specification, specification number, date, and the preparer information.

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4.2.2 Title Page

The title page shall contain the name of the specification, specification number, date, approval blocks, and the preparer information.

4.2.3 Table of Contents

SpecsIntact generates the table of contents automatically. In preparation of a final copy of the project specification, the computer will:

- Produce a table of contents of a complete project specification, listing every division and every section within each division that is part of the project.
- Sequentially renumber paragraphs to correct for added or deleted paragraphs.

4.2.4 Main Text

For content and format of text, see SpecsIntact Quick Start Guide.

4.2.5 Local Master Text

Local Master Text is specific master text created at SSC to cover conditions or requirements that are unique to SSC. If there is a Local Master Text section that covers a topic needed in a specification, the Local section must be used. The Local Master Text sections will be kept up-to-date by SACOM Design Engineering group. SACOM shall provide the Local Master Text to all Architect and Engineering firms as needed.

4.2.6 Reference Listings

Each section contains a Reference Listing paragraph that lists all the publications (Government and industry) referenced in the master text.

For further information, see Section 4.4.4 of this document.

4.2.7 Notes

Each section contains numerous indented, bold print, capitalized NOTES throughout the text. These notes contain information that helps make preparation of the specification easier. Reference to particular products or standards and to other items that should be referenced are contained in the notes. In addition, information concerning the coordination of the specifications with the drawings is addressed. There is no need to redline notes during review of sections since all the notes will be deleted by the computer for the final printout and can be deleted during preliminary review, upon request by the specifier.

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4.2.8 Project Title Heading

The project title heading and specification number will be automatically printed at the top of each page of the specification.

4.2.9 Numbering

4.2.9.1 Specification Publishing Number. This number will be assigned by Central Engineering Files (CEF), at the request of the specifier, prior to development of the construction specification.

4.2.9.2 Paragraph Numbers. It is not necessary to renumber existing paragraphs when deleting or adding text. When the final specification is produced, the SpecsIntact computer program will automatically renumber the printed text. The SpecsIntact system also retains the original numbers so that one can go back to the text and compare it to the master text.

4.2.10 Field Tests and Submittals

For the specifier's reference use only, the computer can search for and print out all "Field Tests" and "Submittals."

The SpecsIntact programs have the capability to extract and print those items that the contractor must submit to the Contracting Officer. Those items that are submittals must be marked using the Submittal Key tag within the SpecsIntact text in order to be printed. This tag generates the Submittal Register.

Test requirements specific to the subject of the specification section may appear anywhere in text, including titles. They range in size from two or three words to a whole paragraph in length.

The specifier shall review the submittal register for duplications, omissions, and errors prior to final release.

4.2.11 Printing

4.2.11.1 Draft Print Options. The draft print may be printed with or without notes. If the entire document is not selected to print, the "Project Table of Contents" and "Print Test/Submittal Requirements" are not available.

4.2.11.2 Final Print Option. The final print differs from the draft print in that it is:

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- a. Always printed without notes (draft prints may be printed with or without notes, by specifier's choice).
- b. Always printed with a project table of contents (during draft print, the operator may print with or without a project table of contents).
- c. Always printed with parts renumbered so that there are no "missing" numbers.

4.2.11.3 Other Print Options. In addition to the draft and final print options, the SpecsIntact Clerk has access to the capabilities through the SpecsIntact system to print the project, a section table of contents, and other verification reports, such as reference sections or submittal requirements.

4.3 Editing Techniques

The specifier uses a print copy of the master file to redline the print copy and return the copy to the SpecsIntact Clerk or designee for processing.

All editing, changes, insertion and/or deletions should be legible and in red to be obvious for encoding. Do not cut up the original text; mark it in red.

Do not omit or change part numbers (paragraph numbers); the computer will automatically number the paragraphs on final printing. All part numbers must have a title. A clearly marked print copy not only ensures a quality final technical specification, but facilitates the SpecsIntact Clerk's job.

Every part, paragraph, and subparagraph within the existing print copy can and should be modified to suit the exact requirements for the particular project. Modifications shall be accomplished by deleting inapplicable text from the existing file copies to precisely define requirements, and adding text to impose requirements not covered by the existing text.

4.4 Specification Standards

4.4.1 General

The specifier's task is to communicate information clearly. Address your specifications to the contractor. Write your information in the form of instructions you want to be followed. It should be factual, specific, concise, comprehensive, and unambiguous. The Government Printing Office (GPO) Style Manual shall be used as a general guide for capitalization, punctuation, compound word forms, numerals in text, and spelling.

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4.4.2 Style

4.4.2.1 Language Style.

- The technical content of a section shall be presented in language free from vague or ambiguous terms.
- Inclusions of essential information shall be complete by either direct statements or reference to other documents.

4.4.2.2 Abbreviations and Acronyms. Abbreviations and acronyms may be used freely, provided the full word(s) or term(s) is spelled out the first time used. Once the abbreviation or acronym has been defined, it shall be used consistently throughout the text.

4.4.2.3 Figures, Sketches, Symbols and Equations. The computer cannot accommodate symbols. If such symbols are vital for the presentation of a requirement, the computer can be keyed to provide blank pages identified by figure number, title, and page number to accommodate figures, sketches, symbols and equations. Only the blank page will become a permanent entry in the digital media.

4.4.2.4 Proprietary Products. Trade names, manufacturer's part numbers, drawing numbers, and other proprietary names may be used to define a standard of quality, provided such use is followed by the words "or approved equal" to ensure wider competition. A relevant list of the salient features shall be included to facilitate a complete understanding of the requirement.

4.4.2.5 Paragraph Headings. Each paragraph and numbered subparagraph shall have a subject-identifying heading. No heading may be longer than 72 positions, including paragraph number, heading, punctuation, letters, numbers, and spaces. The project title that appears at the top of every page in the complete specification is subject to the same 72-position constraint.

4.4.3 Numbering System

- New section numbering shall be consistent with Construction Specifications Institute (CSI) Master Format, and will not duplicate section numbers in the current master.
- The following part numbering system shall be used when generating a new section. Use of the fourth level is occasionally necessary, but should be avoided if possible.

PART 1 – GENERAL	(1 st Level)
1.1 Submittals	(2 nd Level)
1.1.1 Schedules	(3 rd Level)
1.1.1.1 Subparagraph (rarely)	(4 th Level)

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- c. The end of each Section shall be designated with "END OF SECTION" (indented) two lines below the last line of the section text.
- d. For new section numbers, use a number not in the master text.
- e. If a whole section is new, the parts inside it should be numbered in the normal SpecsIntact fashion. The section number should identify material as being new.

Note: Most jobs contain a mix of new material and material taken from the master text.

4.4.4 Reference Documents

4.4.4.1 Order of Precedence. To the extent possible, reference documents should be selected in the following order of preference.

1. Industry specifications and standards: e.g., ANSI, ASTM, NEMA, NFPA.
2. Federal specifications and standards: e.g., FS HH-P-119, FED-STD-595.
3. Military specifications and standards: e.g., MIL-L-3150, MIL-STD-681.

References should be made in the appropriate section part, to the title of the applicable section, subsection, chapter, or paragraph of the referenced publication.

Deviations from referenced documents should be indicated in the project specifications by the "delete and substitute" method.

4.4.4.2 References to Other Sections. References to other sections are encoded in the SpecsIntact computer system. If a section refers to another section for any reason, that referenced section must be edited and included in the package.

4.4.5 Standard Practices

- a. When requiring repair or replacement of materials damaged by the contractor, always include the phrase "at no additional expense to the Government".
- b. When specifying the use of potable water for the test medium, always require approved (by the Contracting Officer) disposal of wastewater (by the contractor).
- c. Do not underline for emphasis. Every word in the specification is of equal importance.
- d. Do not use "per" to mean "in accordance with".

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- e. Do not use a dash to mean "to", as in "1 to 2 feet".
- f. Do not use a virgule ("/") to mean "or" or "and".
- g. Always place a zero before the decimal point in numbers less than 1, as in 0.183.
- h. Be sure that every numbered paragraph has a heading.

4.4.6 Metric System

If the use of the International System of Units (S.I.) Metric System is required for a project, that use must be consistent throughout the specification.

In general, if less than 1 meter, gram, liter, etc., use millimeter, milligram, milliliter, etc. When in doubt, use the most appropriate S.I. standard for units of measure.

4.5 Roadblocks

The following errors in editing the sections will delay completion of the specification package, or waste time in unnecessary effort.

- a. When preparing the final printout of the complete text, the SpecsIntact software will prepare the table of contents, delete the notes, and renumber paragraphs to account for added or deleted text. These items need not be done manually by the project specifier.
- b. If a vendor's published specifications are used that reference other specifications or standards that the product meets, the specifier should verify that these specifications or standards have not been canceled or superseded. The latest revision of the reference must be validated. This will stop production of the package until the discrepancy is resolved.
- c. If a requirement for a product is deleted in PART 2 (Products), all references to that product must be deleted in PART 3 (Execution).
- d. A package cannot contain non-compatible versions of various masters (e.g., Master Format 1995 cannot be used with Master Format 2004).
- e. Be neat and accurate when redlining. Do not let redlines extend part way into a paragraph to be retained. Do not delete a major heading (3.5) if a subparagraph (3.5.6) is to be retained. Do not redline notes.

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- f. Try to follow the existing text in format, mood, and tense when changing or adding text. Do not use symbols as the computer cannot print them. Spell out all engineering units and mathematical operations.

4.6 Specifier's Input in Producing a Project Specification

The guidelines in the following subsections should be used in developing the product specification for initial and subsequent reviews.

4.6.1 Initial/Interim Review

Note: The project specifier will perform all operator functions if processing of the project specification is performed "on-line."

- a. Obtain a copy of the table of contents for the NASA Master File.
- b. Review the table of contents and select those sections pertinent to the project requirements. Obtain file copies of the required sections. Sections not in the Master File must be prepared by the specifier in accordance with Specification Standards.

Note: If submasters, local masters, or previous project specifications are to be used in development of the new project specification, their creation date must be compatible with the date of the master file. Division local master and submasters supersede the installed master file of the same date.

- c. Review and edit the master copies for the individual requirements of the project, or process "on-line".
- d. At this time, try to eliminate all options not applicable to the project.
- e. Fill in blank spaces, such as disposal area, location, dimensions, and quantities.
- f. Verify that all products added or deleted in Part 2, PRODUCTS, have been similarly handled in Part 3, EXECUTION.
- g. Identify any new industry, federal, military, or other documents imposed. Supply exact references, such as source (publisher's name, address and zip code), exact designator (drawing or part number), complete title, and date of document.
- h. Verify that sections referenced within a section are included.

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- i. Ensure that appropriate encoding is included in the text of each section, and new or additional field test requirements, if required.
- j. Identify, in the text of each section, submittals required other than those specified in Section 13 34 00. This is done by writing "..SUBMST" at the beginning and "..SUBMSEND" at the end of the requirement. Through the use of submittal identifiers and test requirements identifiers in the text, the computer will search and print out a summary of those requirements for the engineer's information only.
- k. Submit the edited (original print copy) project specification to the SpecsIntact Clerk for processing.

4.6.2 Processing the Specification

After completing the initial reviews, the specifier submits the redlined Master Text or Local Master Text that comprise the project specification to the SpecsIntact Clerk for processing. After processing, a draft copy of the project specification will be returned to the specifier along with the marked-up print copies. If the Clerk has had difficulty with the markups submitted, there may be questions flagged in the margins of the draft copy. Answer these questions when resubmitting the specifications for further processing.

As subsequent design reviews are held and additional changes made, the specifier will return the current draft copy showing the new red lines to the SpecsIntact Clerk for further processing. This step may be performed as many times as required.

4.6.3 Final Review

In preparation for the final review, the following actions will assist prompt preparation of the specifications package:

- a. When all reviews have been completed, the draft copies, with any additional redlines, are returned for final processing. Sufficient time should be allocated for each project, depending on the size and complexity of the specifications.
- b. The final specification package, including the table of contents, will be returned ready for reproduction.

5.0 AMENDMENTS

If overlooked items are discovered during the bidding period, the change in scope of which is substantial and could easily change who receives the award, it is to the customer's benefit to have those changes bid upon by all the contestants. The vehicle used for making this modification to

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proposed contractual material, and having it become a part of the contract documents, is known as an Amendment. However, Amendments are only applicable before the contract is awarded. The means by which changes are made after the contract is signed are not within the scope of this document and are not addressed.

The role of an Amendment is to modify proposed contractual material during bidding. Since it is issued during bidding, when time is always at a premium, it is especially important that it be read easily and understood easily. One Amendment could impact the bids of several trades. It must be disseminated by all bidders to all of the affected subs and must, in turn, be responded to quickly by them.

The format is designed so that each statement is separated with sufficient white space so that it can be cut-and-pasted on the job. For the same reason, it is preferable to break complicated changes into their various components so the various subcontractors may find their own pertinent instructions easily.

The drawings part of an Amendment can be issued either as revisions to the Contract Drawings or as Amendment drawings. Small changes frequently are issued successfully as 8-1/2 by 11-inch drawings, and are stapled to the typewritten material.

A written Amendment shall be formatted using the following guidelines (see Appendix A).

- a. All pages of an Amendment will be right-hand pages, printed on white bond, 8-1/2 by 11-inches in size.
- b. Amendment numbers will originate from Contracts and Legal, and will be numbered sequentially, using Arabic numbers starting at "1". CEF will be notified of these amendments for file.
- c. Try to include all changes in one Amendment. However, if further changes are necessary, another Amendment may be issued.
- d. Place the title "AMENDMENT NO. (give number)" at the top of each page. It should appear at the top of each succeeding page of the Amendment followed by "(cont)".
- e. Each Amendment shall have a project/specification number centered at the bottom of the page, just above the page number.
- f. Start each Amendment with a simple opening statement, such as, "The proposed Contract Documents for this work are modified as follows:".
- g. Precisely define and index (using sequential Arabic numbers) each modification you wish to be made, listing each modification in the order in which it would appear in the contract package. For example, "1. INVITATION TO BID, 2. SPECIFICATIONS, 3. DRAWINGS".

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- h. For modifications to the Specification, index alphabetically those sections (listed in numerical order) which have changes. Under each numerical title, group all changes pertaining to that section, listing them in the order in which they appear in that section.
- i. End each Amendment with the statement "END OF AMENDMENT NO. (giving Amendment number)".
- j. Number each page of the Amendment, using Arabic numbers and the phrase, "Page __ of __", centered at the bottom of the page.

6.0 RECORDS AND FORMS

Records identified in SSTDs shall be maintained in accordance with applicable requirements of SPR 1440.1. All records and forms are assumed to be the latest version unless otherwise indicated. Quality Records are identified in the SSC Master Records Index.

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APPENDIX A. AMENDMENT PAGE FORMAT

AMENDMENT NO. 1

The proposed Contract Documents for this work are modified as follows:

1. INVITATION TO BID

Bid opening time is changed as follows:

- A. Deposit all bids not later than 1500 on Wednesday, 10 July 2007, at Building 1100, John C. Stennis Space Center, SSC, Mississippi.
- B. Deposit a list of proposed subcontractors, with indication of those who qualify as minority business enterprises and percent of total proposed Contract Sum to be expended to such minority business enterprises, not later than 1000 on Thursday, 11 July 2007, at Building 1100, John C. Stennis Space Center, SSC, Mississippi.
- C. Bids will be matched with lists of proposed subcontractors, and will be opened and publicly read aloud at 1000 on Thursday, 11 July 2007, at Building 1100, John C. Stennis Space Center, SSC, Mississippi.

2. SPECIFICATIONS

A. Section 09 00 00:

In 2.1.1, add to the list of approved equal manufacturers the following:

Fuller-O'Brian
Glidden

3. DRAWINGS

Delete sheet A-37 of the Contract Drawings in its entirety, and substitute sheet A-37 (R-1) in lieu thereof.

END OF AMENDMENT NO. 1 (all caps)

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APPENDIX B. ACRONYMS, ABBREVIATIONS, AND DEFINITIONS

B.1 Acronyms and Abbreviations

ASME	American Society of Mechanical Engineers
CADD	Computer-aided Design and Drafting
CEF	Central Engineering Files
CoF	Construction of Facilities
CSI	Construction Specification Institute
ESD	Engineering Services Department
GPO	Government Printing Office
MIL	Military
NASA	National Aeronautics and Space Administration
NPR	NASA Procedural Requirements
SACOM	Synergy-Achieving Consolidated Operations and Maintenance
SGML	Standard Generalized Markup Language
S.I.	International System of Units
SPR	Stennis Procedural Requirements
SSC	John C. Stennis Space Center
SSTD	John C. Stennis Space Center Standard
UFGS	Uniform Facilities Guide Specifications
WBDG	Whole Building Design Guide

B.2 Definitions

Amendment - Means by which modifications to proposed contract became part of the contract documents before the contract was awarded.

Local Master Text - Specific master text created at SSC to cover conditions or requirements unique to SSC.

Master Text - Boiler plate text compiled from a variety of specifications and used as the baseline for creating new specifications for individual construction projects.

Specifier - Person who originates and writes the new construction specification or the revisions to an existing one.

SpecsIntact (meaning "Specifications Kept Intact") - An automated specification processing system that uses master text, in the Standard Generalized Markup Language (SGML) format, for the preparation of new or revised construction specifications. SGML is an international standard that provides a mechanism for defining and tagging (encoding) elements of information within documents to allow sharing of information among various hardware platforms and software packages.

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APPENDIX C. SPECIFICATION SECTIONS AVAILABLE ON SPECSINTACT

DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS

DIVISION 01 – GENERAL REQUIREMENTS

DIVISION 02 – EXISTING CONDITIONS

DIVISION 03 – CONCRETE

DIVISION 04 – MASONRY

DIVISION 05 – METALS

DIVISION 06 – WOOD, PLASTICS, AND COMPOSITES

DIVISION 07 – THERMAL AND MOISTURE PROTECTION

DIVISION 08 – OPENINGS

DIVISION 09 – FINISHES

DIVISION 10 – SPECIALTIES

DIVISION 11 – EQUIPMENT

DIVISION 12 – FURNISHINGS

DIVISION 13 – SPECIAL CONSTRUCTION

DIVISION 14 – CONVEYING EQUIPMENT

DIVISION 21 – FIRE SUPPRESSION

DIVISION 22 – PLUMBING

DIVISION 23 – HEATING, VENTILATING, AND AIR CONDITIONING

DIVISION 25 – INTEGRATED AUTOMATION

DIVISION 26 – ELECTRICAL

DIVISION 27 – COMMUNICATIONS

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

DIVISION 31 – EARTHWORK

DIVISION 32 – EXTERIOR IMPROVEMENTS

DIVISION 33 – UTILITIES

DIVISION 34 – TRANSPORTATION

DIVISION 35 – WATERWAY AND MARINE CONSTRUCTION

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DIVISION 40 – PROCESS INTEGRATION

DIVISION 41 – MATERIAL PROCESSING AND HANDLING EQUIPMENT

DIVISION 42 – PROCESS HEATING, COOLING, AND DRYING EQUIPMENT

DIVISION 43 – PROCESS GAS AND LIQUID HANDLING, PURIFICATION, AND
STORAGE EQUIPMENT

DIVISION 44 – POLLUTION CONTROL EQUIPMENT

DIVISION 48 – ELECTRICAL POWER GENERATION